PRENATAL EXPOSURE TO RESIDENTIAL OUTDOOR AIR POLLUTION AND INFANT MENTAL DEVELOPMENT: MODULATION BY ANTIOXIDANTS AND DETOXIFICATION FACTORS

Monica Guxens, *Center for Research in Environmental Epidemiology (CREAL), Hospital del Mar Research Institute (IMIM), Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), Spain*
Inmaculada Aguilera, *Center for Research in Environmental Epidemiology (CREAL), Hospital del Mar Research Institute (IMIM), Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), Spain*
Ferran Ballester, *University of Valencia, Centre for Public Health Research (CSISP); Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), Spain*
Marisa Estarlich, *Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), Centre for Public Health Research (CSISP), Spain*
Ana Fernández-Somoano, *Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), University of Oviedo, Spain*
Aitana Lertxundi, *University of Basque Country (EHU-UPV), Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), Health Research Institute (BIODONOSTIA), Spain*
Nerea Lertxundi, *University of Basque Country (UPV-EHU), Health Research Institute (BIODONOSTIA), Spain*
Adonina Tardón, *University of Oviedo, Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), Spain*
Martine Vrijheid, *Center for Research in Environmental Epidemiology (CREAL), Hospital del Mar Research Institute (IMIM), Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), Spain*
Jordi Sunyer, *Center for Research in Environmental Epidemiology (CREAL), Hospital del Mar Research Institute (IMIM), Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), Spain*

Background and Aims: Effects of air pollution on children's neurodevelopment have recently been suggested. We aimed to assess whether prenatal exposure to residential outdoor air pollution impaired infant's mental development, and whether antioxidant/detoxification factors modulate this association.

Methods: In the Spanish INMA (Environment and Childhood) Project, 2,644 pregnant women were recruited at 1st trimester. Nitrogen dioxide (NO_2) and benzene were measured with passive samplers covering the study areas. Land-use regression models were developed for each pollutant and applied to predict outdoor air pollution levels at each women address during the whole pregnancy. Information on parental socio-demographic, life-style, and child characteristics was obtained by questionnaire. Maternal diet was obtained in the 1st trimester through a validated food frequency questionnaire. Maternal circulating vitamin D in pregnancy were determined by radioimmunoadsorbant assay. Around 14 months, infant mental development was assessed using the Bayley Scales of Infant Development.

Results: Median exposure was 28.1µg/m^3 for NO_2 and 1.2µg/m^3 for benzene. Exposure to NO_2 and benzene showed a negative association with mental development, though not statistically significant, after adjusting for a large array of potential confounders (• (95%Confidence Interval) = -0.74 (-3,73;2,26) and -1.40 (-3,71;0,91), for a doubling in each compound, respectively). Stratifying by antioxidant/detoxification variables, a significant negative relation of both compounds in infants with low maternal intakes of fruits and vegetables during pregnancy was observed (-3.62 (-6,57;-0,68) and -3.56 (-6,12;-1,00), respectively) although interaction terms were only borderline significant (p<0.10). A negative non-significant association in non-breastfed infants and in infants with low maternal levels of vitamin D was also found.

Conclusions: This study supports the hypothesis that prenatal exposure to residential air pollutants may adversely affect infant mental development, and that these effects may be limited to infants whose mothers have low levels of antioxidant intakes and/or detoxification factors.